Team leader(s): Garth Huber **Project number: 43227**

Administrative Institution: University of Regina

Project title: Solenoidal Large Intensity Device (SoLID) Heavy Gas Cherenkov Detector

Funding recommendation: Full funding **Recommended amount:** $509,500

Exceptional project: Yes

Rationale for the MAC recommendation:

This proposal builds on a well-established international collaboration in physics for which Canada has been a leader for some time. The Solenoidal Large Intensity Device (SoLID) will use the detector and readout technology developed with CFI funding to enable further study of Quantum Chromo Dynamics (QCD), thereby ensuring Canada's continued participation in this international project and maintaining Canada's leadership in this field. The research program is innovative, highly competitive, and well described, with preliminary work that speaks to a mature project design and pre-emptive mitigation of several possible risks associated with this project. The team has the necessary experience, breadth of expertise and leadership required to deliver the project, as evidenced by their history of successful collaborations and previous experience conducting physics data analyses for the Thomas Jefferson National Accelerator Facility experiments. The proposal adequately describes specific challenges and systemic barriers impacting the inclusion of equity-deserving groups and concrete practices have been adopted, both on the institutional level and on the collaboration level, to mitigate these barriers, including remote access to the facility for those unable to attend in person. The team has demonstrated a clear commitment and awareness of EDI challenges, however, in alignment with the Expert Committee, the MAC recommends that the team continue to develop their understanding of EDI principles, systemic barriers and implementation of mitigation strategies.

The proposal is requesting funds to develop a key component of SoLID: the Heavy Gas Cherenkov detector. The requested infrastructure is necessary, appropriate, and vital to the scientific program and an integral part the SoLID facility. The well-described existing SoLID Collaboration structure will ensure appropriate management and oversight of the infrastructure, including operation and maintenance activities for which costs have been reasonably delineated. The committee is confident that the ongoing support of national and international collaborators will maintain the project over its long lifespan. Moreover, the infrastructure will enhance and build upon existing infrastructure, including the reuse of parts from concluded projects, providing cost savings and extended use of infrastructure purchased with CFI funds.

Most importantly, the proposed program of research is expected to maintain Canada's prominence and international leadership in this field. Their research is expected to generate important knowledge and has potential for eventual breakthroughs in the fields of medical physics and biological research (e.g., radiotherapy dose calibration). Though the proposal did not describe the expected number of highly qualified personnel that would be trained through this program, the team intends to contribute to the growth of the field in a powerful and intentional way through training and education opportunities to a broad group of individuals, including elementary and high-school students, which the committee believed to be a strength. Beyond academic contributions and dissemination, for which the team has a clear plan, the proposal also describes appropriate prospects and collaborators for technology transfer to applications.

This project has exceptional merit. Overall, the MAC agrees this skilled team is proposing internationally competitive research that will maintain Canada's global leadership Quantum Chromo Dynamics. There is strong confidence that the Solenoidal Large Intensity Device (SoLID) Heavy Gas Cherenkov Detector will be optimally used and maintained. The proposal identifies clear pathways to important academic and health benefits.

Enable internationally competitive research	Enhance and optimize capacity	Benefits to Canadians
SA	**SA**	**SA**

Legend for assessment: EX = Satisfies and significantly exceeds the objective in one or more aspects, SA = Satisfies the objective in all aspects, SW = Satisfies the objective with only a few minor weaknesses, PS = Partially satisfies the objective with some significant weaknesses, NS = Does not satisfy the objective due to major weaknesses